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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,179	11/14/2003	Stefano Cervini	03-LJ-064	9391
7590 Lisa K. Jorgenson, Esq. STMicroelectronics, Inc. 1310 Electronics Drive Carrollton, TX 75006				
			EXAMINER KAWSAR, ABDULLAH AL	
			ART UNIT 2195	PAPER NUMBER
			MAIL DATE 12/18/2009	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/714,179

**Applicant(s)**

CERVINI, STEFANO

**Examiner**

ABDULLAH AL KAWSAR

**Art Unit**

2195

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7, 9-21 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-21 and 23-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1-7, 9-21 and 23-28 are pending.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 6-7, 9-10, 13-17, 20-21, 23-24, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al.(Wilkinson) US Patent no. 6094715, in view of Lorie et al.(Lorie) US Patent No. 4435758, and further in view of Kalman(Kalman) US Patent No. 6823517.

3. As per claim 1, Wilkinson teaches the invention as claimed including an apparatus for executing at least one single multiple data(SPMD) program in a microprocessor, said apparatus comprising:

a micro single instruction multiple data (SIMD) unit associated with a microprocessor (col 7, lines 25-27); and

a job buffer(BCI buffer) having an output coupled to an input of said SIMD unit(PME) (col 24, lines 49-55; col 75, lines 1-4), said job status comprising a program counter value and a loop-counter list, and wherein a job is a combination of program and an input data-set (col 24,

lines 9-17; lines 34-47; col 33, lines 51-65 through col 34, lines 1-7; par. 26, lines 6-21; col 29, lines 44-52; col 39, lines 60-65; col 27, lines 6-21).

Wilkinson does not specifically disclose the said job status comprises loop-counter list.

It would have been obvious to a person in ordinary skill in the art at the time of the invention to have a loop count list as status of a task as it is well know variable and used to define the number a iteration a program needs to confirm the instruction execution is complete and also gives the system ability to resume/restart from the same position after a context switch.

Wilkinson does not specifically disclose wherein said job buffer dynamically bundling jobs into a task based on an equivalence of a job status of said jobs and allocates said task to said micro SIMD unit.

However, Lorie teaches wherein said job buffer dynamically bundling jobs into a task based on an equivalence of a job of said jobs and allocates said task to said micro SIMD unit, said job status comprising a program counter value and a loop-counter list (col 1, lines 32-45).

4. It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Lorie into method of Wilkinson to dynamically bundle the similar jobs into a task for execution on a SIMD unit. The modification would have been obvious because one of the ordinary skills of the art would bundle the similar tasks together and allocate them to a SIMD unit to minimize the inter-processor communication.

Lorie do not specifically disclose that the said job buffer dynamically bundling jobs into a task based on an equivalence of a job status of said jobs.

However Kalman teaches said job buffer dynamically bundling jobs into a task based on an equivalence of a job status of said jobs (col 10, lines 9-26).

5. It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Kalman into the combined method of Lorie and Wilkinson to dynamically bundle the job based on job status. The modification would have been obvious because one of the ordinary skills of the art would bundle the job with same status to maximize system efficiency.

6. As per claim 2, Wilkinson teaches said micro SIMD unit is capable of sending job status information to said job buffer (col 73, lines 1-4; col 48, lines 28-30).

7. As per claim 3, Wilkinson teaches said at least one SPMD program comprises a plurality of input data streams having moderate diversification of control flows (col 8, lines 25-29).

8. As per claim 6, Wilkinson teaches said apparatus executes a plurality of SPMD programs and wherein each SPMD program of said plurality of SPMD programs is executed on a number of input data streams ( col 8, lines 19-2).

9. As per claim 7, Wilkinson teaches said number of input data streams is greater than a program granularity threshold (col 41, lines 24-36).

10. As per claim 9, Lorie teaches said apparatus performs job clustering to form a job bundle in which each job in said job bundle has an equivalent control flow (col 1, lines 32-45).

11. As per claim 10, Kalman teaches said apparatus performs said job clustering based on a job processing status of said jobs in said job bundle (col 10, lines 9-26).

12. As per claim 13, Lorie teaches said apparatus maximizes a size of a job cluster by selecting tasks for execution in which a job processing status of each of said tasks is complete (col 8, lines 51-67).

13. As per claim 14, Wilkinson teaches said apparatus executes a data loading phase for a task before said apparatus executes a task execution phase for said task (col 24, lines 2-8; lines 17-26).

14. Claims 15-17, 20 and 21 are system claims of claims 1-3, 6 and 7 above. They are therefore rejected under the same rationale.

15. As per claims 23, 24, 27 and 28, they have similar limitations as of claims 9, 10, 13 and 14 above. Therefore, they are therefore rejected under the same rationale of claims 9, 10, 13 and 14 above.

16. Claims 4, 5, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al.(Wilkinson) US Patent no. 6094715, in view of Lorie et al.(Lorie) US Patent No. 4435758, and further in view of Kalman(Kalman) US Patent No. 6823517, as applied to claims 1 and 15 above, and in view of Pechanek et al. US Patent No. 6,470,441 B1.

17. As per claim 4, Wilkinson, Lorie and Kalman do not specifically disclose apparatus executes said at least one SPMD program once for each input data stream of said plurality of input data streams.

However, Pechanek teaches said apparatus executes said at least one SPMD program once for each input data stream of said plurality of input data streams (col 4, lines 62-65).

18. It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Pechanek into combined method of Kalman, Wilkinson and Lorie to execute SPMD once for each data stream. The modification would have been obvious because one of the ordinary skills of the art would have a SPMD program execution once for each data input stream as it would reduce the latency of process execution.

19. As per claim 5, Wilkinson teaches said apparatus generates an instruction stream for each input data stream of said plurality of input data streams (col 8, lines 25-28).

20. As per claims 18 and 19, they have similar limitations as of claims 4 and 5 above. Therefore, they are therefore rejected under the same rationale of claims 4 and 5 above.

21. Claims 11, 12, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al.(Wilkinson) US Patent no. 6094715, in view of Lorie et al.(Lorie) US Patent No. 4435758, and further in view of Kalman(Kalman) US Patent No. 6823517, as applied to claims 1 and 15 above, and further in view of “Multi-thread VLIW processor architecture for HDTV decoding” by Hansoo Kim(Kim).

22. As per claim 11, Wilkinson, Kalman and Lorie do not specifically disclose forces a task to terminate at a point where a job control path might fork by placing a code-stop.

However, Kim teaches said apparatus forces a task to terminate at a point where a job control path might fork by placing a code-stop in said task (page 3, col 1, lines 3-8, “the program can ..... entries exceeds a predefined number.”)

23. Therefore, it would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Kim into the combined method of Kalman, Wilkinson and Lorie to have a task termination point to switch task. The modification would have been obvious because one of the ordinary skills of the art would have a task switch to fulfill special conditions of system execution and prioritize execution.

24. As per claim 12, Kim teaches said apparatus minimizes a required number of code-stops to be placed in said task by excluding from code-stop placement each control flow statements



that is equivalent to a select instruction (page 3, col 1, lines 3-8, "the program can ..... exceeds a predefined number.").

25. As per claims 25 and 26, they have similar limitations as of claims 11 and 12 above. Therefore, they are therefore rejected under the same rational of claims 11 and 12 above.

***Response to Argument***

26. Applicant's arguments filed 11/11/2009 have been fully considered but they are not persuasive.

27. In the remarks applicant argues that:

(1) Wilkinson fails to teach job status comprising a program counter value in the context of the job buffer for SIMD unit..

(2) Applicant argues the that official notice taken by the examiner as the job status including loop-counter list is not obvious.

(3) Lorie fails to teach dynamically bundling jobs at runtime into tasks based on equivalence of job status of the jobs.

(4) Kalman fails to teach grouping task for allocation to an SIMD unit.

28. Examiner respectfully disagree to applicant:

- i. As to point (1), applicant supports his argument mentioning that Wilkinson fails to teach job status comprising program counter value in the

context of the job buffer for the SIMD unit. Examiner respectfully disagrees with the applicant. The claimed limitation is broad and does not disclose that the job status comprising program counter value in the context of the job buffer for the SIMD unit, the claimed invention does not disclose any limitation that recites what is the equivalence of job status with program counter value and loop-counter list and how and where those values are generated or stored from and how they are compared to find the equivalence of the job status. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. Wilkinson teaches program context that stores the status including program counter (col 29, lines 44-52).

ii. As to point (2), applicant supports his argument mentioning that it is not well known in the art for the job status to include program counter and loop-counter list and challenges official notice taken by the examiner. Examiner respectfully disagrees with the applicant. In response to applicants challenge to the official notice US Patent No. 4754393( Kitson et al.) is provided as evidentially support. Kitson was cited in the notice of reference cited in the office action mailed on 8/11/2009. Kitson teaches a job status including loop-counter list and program counter (col 19, lines 23-30).

iii. As to point (3), examiner respectfully disagrees with the applicant. The claimed invention fails to recite any limitation that dynamically bundling the jobs at runtime into tasks based on an equivalence of a job status of the jobs. The claim only recites bundling the jobs and allocating them to the SIMD unit without disclosing if the bundling was done at runtime or not and how the equivalence is compared. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims.

iv. As to point (4), examiner respectfully disagrees with the applicant. The rejection is based on a combination of Lorie in view of Kalman wherein Lorie teaches grouping the similar tasks to allocate them to the SIMD unit but does not specifically disclose that the grouping is done based on status of the job even though the jobs are being grouped together based on instruction stream flow (col 1, lines 32-45). However Kalman teaches grouping the task together based on the task state (col 10, lines 9-10; lines 26-27). It would have been obvious to a person of ordinary skill in art at the time of invention was made to incorporate the teaching of Kalman into the combined method of Lorie and Wilkinson to dynamically bundle the job based on job status. The modification would have been obvious because one of the ordinary skills of the art would bundle the job with same status to maximize system efficiency.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ABDULLAH AL KAWSAR whose telephone number is (571)270-3169. The examiner can normally be reached on 7:30am to 5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng Ai T. An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner, Art Unit 2195

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